

Awareness, Attitude and Practices of Households towards Solid Waste Management: A Study of Mokokchung district of Nagaland

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Abstract:

Household solid waste management is a major concern for any community as it is directly connected to the daily lives of the people. However, lack of knowledge on the proper handling of waste and poor practices acts as barriers to effective management of household waste. The objective of this paper is therefore to assess the awareness, attitude and practices of the households towards solid waste in the urban areas of Mokokchung district of Nagaland. The study has been conducted using a well-designed and validated questionnaire which was administered to 248 households selected through simple random sampling. The data has been analysed using simple statistics and has been presented using bar graphs, figures and tables. The study shows that while there is a high level of awareness on solid waste management, this awareness has not led to corresponding attitude and waste management practices among the households. The study highlights the need for stronger institutional mechanisms, regular awareness programs, and community engagement to translate awareness into sustainable waste management practices

Keywords: Awareness, Attitude, Practices, Solid Waste Management, Nagaland

Introduction

Rapid urbanization and changing consumption patterns have significantly increased the volume of municipal solid waste generated across the world. The growth of urban populations has resulted in greater demand for goods and services, which consequently produces large quantities of waste from residential, industrial, commercial, and institutional sources. Managing this waste has become one of the most pressing environmental challenges faced by developing countries (Baskar et al., 2022). Robinson (1986) defines solid waste as by-products of household or commercial activities that have lost their value to the original user but may still have potential value to others. According to the Solid Waste Management Rules (2016)

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of India, solid waste includes domestic waste, sanitary waste, commercial waste, institutional waste, horticultural waste, agricultural waste, street sweepings, and treated biomedical waste.

Urbanization has intensified the challenge of waste management worldwide. According to the UNCTAD Handbook of Statistics (2023), more than half of the population in developing regions now resides in urban areas. India is experiencing a similar trend, with the urban population increasing steadily due to economic growth and migration. The Urban Statistics Report (2022) estimates that India's urban population will rise from 34.5 percent in 2021 to nearly 39.6 percent by 2036. While urbanization contributes to economic development, it also leads to increased consumption and waste generation, particularly non-biodegradable waste such as plastics, electronic waste, and chemical residues. These materials pose serious environmental and public health risks. India generates approximately 62 million tonnes of municipal solid waste annually, yet only 20–25 percent is processed or recycled (Johri, 2024). The remaining waste is disposed of in landfills, burned, or dumped in open spaces, causing soil degradation, water contamination, and the spread of diseases. The heterogeneity of the waste makes sorting and utilization of waste a huge task and therefore most of the waste finds its way in open drains, streams or vacant plots. Disposal of solid waste garbage and of untreated effluent into nearby drains by people is also due to the lack of public awareness on the consequences of waste on health and the environment. Another reason is the lack of financial incentives to stop them from such practices. (Hussein I. Abdel-Shafy and Mansour, 2018). Any design for management of waste depends on how waste is segregated and on the level of public awareness and active participation from the public.

Several countries have adopted innovative approaches to address waste management challenges. Nations such as Japan, Singapore, and Germany have developed efficient waste management systems through strict regulations, technological innovation, and strong community participation. In contrast, many countries, including India, continue to struggle due to weak institutional mechanisms, inadequate infrastructure, and low levels of public participation. Although the Government of India has launched initiatives such as the Swachh Bharat Abhiyan in 2014 to promote cleanliness and waste management awareness, the effectiveness of these programs varies across regions. In many towns and cities, waste management remains inadequate due to poor segregation practices, lack of civic responsibility, and weak enforcement of regulations.

Public awareness and attitude therefore play an important role in solving the SWM problems. Public awareness of and attitudes toward waste can affect the entire SWM system (Zhu et al., 2007). All steps in SWM—from household waste storage to waste segregation, recycling, collection frequency, amount of

littering, willingness to pay for services, and opposition to the setting of treatment and disposal facilities—depend on public awareness and participation. Thus, awareness and attitudes are crucial to the success or failure of a SWM system. Golmei & Pongen (2020) states that disposal of garbage, solid waste and of untreated effluent into nearby drains by people is also due to the lack of public awareness on the consequences of waste on health and the environment. Any design for management of waste depends on how waste is segregated and on the level of public awareness and active participation of the public. Zaman & Ahsan (2019) points out that waste is not just an engineering problem that needs to be solved with advanced technology alone, but it is also a social problem that requires social technology i.e., effective recycling and community involvement to resolve the problem completely. Anchan & Palakshappa (2021) argued that community involvement in activities like recycling, encouraging participation in decision making, waste segregation at source are some key factors in SWM. Ogbonna, et al., (2002) also believe that environmental management and protection should be a joint government/industry/community participatory program. Participatory environmental management should have the people as its focus and uphold their needs, perceptions, knowledge, and value. Karthikeyan & Rani (2018) suggests proper measures to be taken to create public awareness and to bring about changes in public behaviour through development of public awareness programs, such as promotion of “Reduce, Re-use and Re-cycle (R-R-R)” of waste principle; promotion of public participation in SWM systems; inculcation of public education through group education by group meetings in the community, workshops, exhibitions, lecture series, panel discussions, promotion of mass education through the use of print and electronic media, use of school children, provision of primary school curriculum to cover the subject, involvement of religious leaders, involvement of SHGs, NGO involvement etc. In this context, understanding the awareness and practices of residents toward waste management becomes essential for designing effective policies.

Methodology

Research Design

The study adopted a descriptive research design to examine the relationship between awareness, attitude and practices of households toward solid waste management.

Study Area

The research was conducted in Mokokchung town, one of the major urban centers in Nagaland. The Mokokchung Metropolitan Area includes settlements from Alichen in the south to Amenyong and Khensa

in the northwest, and from Mokokchung town to DEF Colony in the northeast (GOI, Ministry of MSME). The process of sub urbanization in recent years has led to the mushrooming of satellite towns like Yimyu and Marepkong leading to the extension of urban settlement outside the historical boundary of Mokokchung Town. These urban extensions are now wards under the Mokokchung Municipal Council.

Sample Size and Sampling Method

A total of 248 households were selected from 18 wards using simple random sampling. One adult member from each household was interviewed.

Data Collection and Analysis

Primary data were collected using a semi-structured questionnaire. Face-to-face interviews were conducted after obtaining written informed consent from respondents. The questionnaire collected information on:

- Socio-demographic characteristics
- Awareness of Households towards waste management
- Attitude of Households towards waste management
- Household waste management practices

Data has been analysed using simple statistics and has been presented using bar graphs, figures and tables.

Results & Discussion

I. Demographic Characteristics of the Participants

A total of 248 households were selected, and one adult member of each household was interviewed. Table 1 represents the socio-demographic characteristics of the households. Of the study population 72.58 percent were between the age range of 15-29 years, 22.98 percent in the age range of 30-44 years and 4.03 in the age range of 45- 59 years and 0.40 percent in the age group of 60-70 years. More than half of the respondents were female (52.41 percent) and the rest were males (47.58 percent). From the total respondents, 30.24 percent had completed Master's degree and above, 32.25 percent were graduates, 24.59 percent were undergraduates, 9.27 percent were below higher secondary level and only 3.62 percent were below high school.

Table.1. Distribution of socio-demographic characteristics of the participant.

Variable	Category	N	%
Age	15-29	180	72.58
	30-44	57	22.98
	45-59	10	4.032
	60-74	1	0.403
Gender	Male	118	47.58
	Female	130	52.41
Education	Below High School	9	3.629
	Below Higher Secondary	23	9.274
	Below Undergraduate	61	24.59
	Graduate	80	32.25
	Master's and above	75	30.24

Source: Fieldwork

II. Awareness Level of Waste Management by the Household

A total of 87.7 percent of the respondents were of the view that waste has become a huge problem in the town areas of Mokokchung. Table 2 presents the respondents' perceptions regarding the major factors contributing to the increase in waste generation in Mokokchung town. The findings indicate that the easy availability of plastic-packed items (85 percent) is perceived as the most significant factor responsible for the rise in waste generation. This suggests that the increasing dependence on packaged consumer goods and single-use plastics has substantially contributed to the growing volume of waste in urban households. A large proportion of respondents also identified lack of individual concern toward waste disposal (83 percent) as a major cause. Another important factor cited by respondents is the increase in spending capacity (67 percent), which reflects how rising purchasing power and consumerism have led to higher consumption levels and consequently more waste generation. Similarly, lack of penalties for improper waste disposal (66 percent) was also reported as a contributing factor. Institutional factors were also highlighted, with 59 percent of respondents pointing to the lack of sensitization or awareness programmes as a reason for the growing waste problem. Interestingly, only 35 percent of respondents considered lack of formal education as a major factor, indicating that the increase in waste generation is not primarily related to educational levels but rather to lifestyle changes, consumption patterns, and institutional shortcomings.

Table 2. Reasons for the increase generation of waste

Sl.No	Particular	Respondents	Percentage
1	Consumerist culture	145	58
2	Increases in spending capacity	167	67
3	Easy availability of plastic packed items	213	85
4	Lack of concern from individuals	207	83
5	Lack of sensitization programme	147	59
6	Lack of any penalty	164	66
7	Lack of formal education	88	35

Source: Fieldwork

The respondents also exhibited a high level of awareness on the importance of segregation of waste. A total of 88.7 percent responded that segregation of waste is crucial when it comes to managing waste in the locality. All the households were aware of the various health risks like Cholera, Diarrhea, Malaria, Dengue and various accidents and injuries that results due to improper management of waste. Similarly, all the households were equally aware of the various environmental risks like air, water, land pollution and blockage of drain, increasing stench or smell due to improper disposal of waste. The household also exhibited a high level of awareness on the importance of community initiatives in managing waste. 98.7 percent of the households considered conduct of regular social work in the locality as an important mechanism for maintaining solid waste in the locality. Further, 93.95 percent of the respondents were of the opinion that regular conduct of social work helps in spreading awareness on the importance of proper management of waste.

Table 3. Awareness Level of the Households

Sl.No	Questions	Yes	%	No	%
1	Do you think segregation of waste is important to manage waste	220	88.70	1	0.403
2	Are you aware of health risks due to improper dumping of solid waste	248	100	0	0
3	Are you aware of environmental risks due to improper management of solid waste	248	100	0	0
4	Do you think regular conduct of social work is important for managing solid waste in the locality	245	98.79	3	1.209
5	Do you think regular conduct of social work helps in spreading awareness on the importance of managing waste	233	93.95	15	6.048

Source: Fieldwork

III. Attitude of the Households towards Waste Management

The table given below represents the attitude of the respondents household waste management. On the question of managing waste, 50 percent of the households responded that it is the duty of the individual or the household to manage the waste in the wards, while 71 percent said that it is the duty of the municipality and only 11 percent said that it is the duty of the civil society organisations. Further, 65 percent were of the opinion that non-cooperation from the public is one of the major reason for the poor management of solid waste and 34.6 percent stated that it is due to the poor management by the ward councils . Lack of interest by the public and also lack of knowledge were also some of the reasons cited by the respondents for the poor management of waste in the wards. Overall the respondents showed a positive attitude towards the managemof waste in the ward with 91.93 percent affirming that they are satisfied with the current collection of waste in their wards.

Table 4. Attitude of the households towards waste management

Sl.No	Questions	Yes	%	No	%
1	It is my responsibility to manage solid waste in the locality	126	50.80	122	49.19
2	The municipality is responsible for managing solid waste in the ward	178	71.77	70	28.22
3	Civil society organisations are responsible for managing solid waste in the ward	29	11.69	219	88.30
4	Non-cooperation from the public is the main reason for poor waste management	162	65.32	86	34.67
5	Poor management by the ward council is the main reason for poor waste management	86	34.67	162	65.32
6	Lack of interest by the public is the main reason for poor waste management	121	48.79	127	51.20
7	Lack of knowledge about waste is the main reason for poor waste management	104	41.93	144	58.06
8	I am satisfied with the waste collection system in my ward	228	91.93	20	8.06
9	Ward council is effective in managing waste in the locality	199	80.24	49	19.75

Source: Fieldwork

IV. Household Practice and Solid Waste Management

Biodegradable waste (mainly food waste) constituted 82.5 percent of the total waste generated. In contrast, non-biodegradable waste accounted for only 17.5 percent of the total waste. On the question of waste segregation, while 88.8 percent agreed that segregation of waste is crucial for management of waste in the ward, only 39.9 percent of the respondents reported that they segregate their waste, while 63.7 percent reported that they collect all the waste and take it to the collection point for further disposal by the MMC. A small section of the household, 1.61 percent reported that they throw waste in the open space or drain. One of the main reasons cited for non-segregation of waste was the unavailability of space to compost the food waste and lack of time. A total of 54 percent from those households who practice waste segregation were found to be engaged in using the biodegradable waste as compost for garden/domestic animals. Further, majority of households (91.9 percent) stated that they were not involved with any groups/organizations that deal with environmental issues.

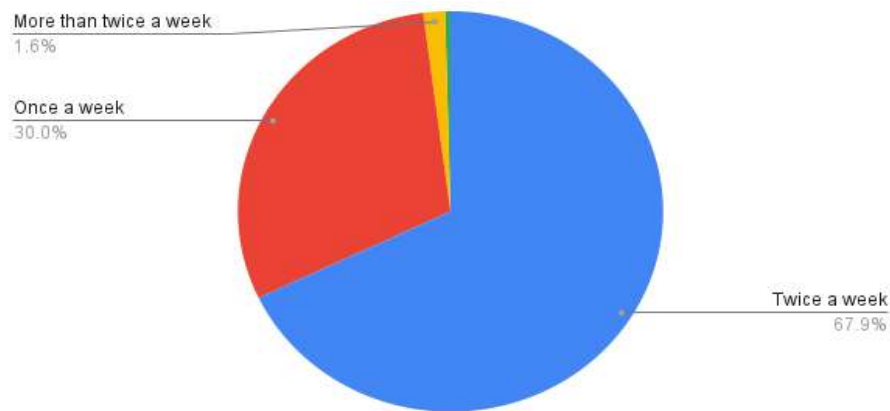
Table 5. Practices of the households towards waste management.

Sl. No	Questions	Yes	%	No	%
1	I segregate biodegradable and non-biodegradable waste at home	99	39.91	149	60.08
2	I collect all the waste and take it to the collection point	158	63.70	90	36.29
3	I throw waste in the open space/drain	4	1.612	244	98.38
4	I use bio-degradable waste as compost for my garden/ domestic animals	134	54.03	114	45.96
5	I am involved in organizations/groups that deals with environmental issues	20	8.064	228	91.93

Source: Fieldwork

On the question of waste management, since all the 18 wards are under the Mokokchung Municipal Council (MMC), households waste is collected and disposed of to a dumping site located on the outskirts of the town by the MMC. In terms of frequency of waste collection, it differed from ward to ward. The figure provided below represents the frequency of waste collection.

Figure 1: Frequency of waste collection



Source: Fieldwork

The data indicates that most respondents receive waste collection services twice a week, while a smaller proportion reported collection once a week or more than twice a week. A large majority of respondents, 67.9 percent, reported that waste is collected twice a week. This suggests that the municipal waste collection system operates regularly for most households and provides a relatively consistent service. About 30 percent of respondents stated that waste is collected once a week. This indicates that some areas experience less frequent waste collection, which may lead to waste accumulation if not managed properly. Only 1.6 percent of respondents reported that waste is collected more than twice a week. However, since waste is not collected daily, all the households had a practice of storing waste in the dustbins or plastic bags leading to unhygienic conditions. This was an issue particularly for those households who do not practice segregation of waste.

The study also shows that it is mandatory for all households to pay sanitation fee for the management of household waste. Most of the respondents were within the lower payment ranges, while only a few respondents pay higher amounts. Most of the respondents pay between ₹75 and ₹150, which represents the highest concentration of households in the chart. Another noticeable group pays below ₹75, indicating that many households incur relatively low costs for waste collection services. A smaller number of respondents fall within the ₹150 to ₹225 range, showing that fewer households pay moderately higher fees. Beyond this range, the number of respondents decreases significantly, with only very few households paying amounts above ₹300.

Solid waste is also managed in the ward through the regular conduct of social work by the ward authorities in their respective wards. A total of 74.4 percent of the households reported that their wards conduct social work on a regular basis to maintain cleanliness in the locality. 81 percent of the household reported that social work is conducted once every month, while 18 percent said that it is conducted twice a month. However, only 19.2 percent of the household responded that they participate in social work all the time, while 28 percent said most of the time, 38 percent said they participate only sometimes and 14.8 percent said that they have never participated in any social work in the ward.

Conclusion

The findings of the study show that residents are aware of the increasing generation of waste largely due to the lack of concern by the residents towards solid waste management. Further, it shows that households have awareness of the different types of waste and the different health issues that come with improper disposal of solid waste. However, this awareness has not led to a change in the attitude of the households towards waste management. This is evident from findings that majority of the respondents consider management of waste as the responsibility of the municipalities. This is also reflected in the poor participation of households in various social work conducted regularly by the ward authorities. Such an attitude reflects lack of initiative and responsibility towards effective management of waste. The households also exhibited poor practices of waste management. Majority of the households do not practice segregation of waste and practice disposal of waste through the collection point identified by the MMC. This practice of non-segregation is an issue particularly for the Municipal Council operating in the area. Since waste is not segregated at the household level, all the waste is simply collected and dumped in a dumping site. The study shows that the common households practice is therefore waste disposal and not waste management as waste is collected and disposed without segregation or recycling. The study, therefore, suggests that there is a need to undertake regular community sensitization programmes on waste segregation and management focusing on the three R's – Reduce, Reuse and Recycle. Focus should be on segregation of waste since the foundation of proper waste management is feasible only through segregation of waste. Fines on violators, no collection policy on non-segregated waste, engagement of the community, youth and churches will also go a long way in developing a robust waste management mechanism. Municipal Council should also work towards shifting from the old method of collection and dumping in landfill to developing innovative and scientific methods to deal with solid waste. Policies aimed at reducing waste, converting collected waste into energy, collaborating with start-ups or NGO's working on solid waste management, innovating community-based waste management strategy are some of the efficient ways towards which the

Municipality should move towards. The issue that needs a review is not about efficient collection of waste but coming up with mechanisms for the scientific segregation and management of waste in an environment friendly manner involving the community at large.

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